

CLAIMS

I claim:

1. A self-powered, wearable personal air purifier (10) characterized in having:
 - a main frame (12);
 - an air conduit (44) disposed in a longitudinal direction along said main frame (12) and having an air inlet (32) and an air outlet (36);
 - a multiplicity of air filters (28, 170) disposed transversely across said air conduit (44);
 - a HEPA filter (30) disposed transversely across said air conduit (44);
 - one or more fans (42) disposed transversely across said air conduit (44);
 - a power source (72) electrically connectible to said one or more fans (42);
 - an airtight cover (52) disposed around said air conduit (8) exclusive of said air inlet (32) and said air outlet (36); and
 - body attaching means (54, 56, 176, 178) by which said air purifier (10) is removably attachable to an animal body, including humans.
2. The air purifier (10) of claim 1 wherein said multiplicity of air filters (28, 170) is disposed across said air conduit (44) in a pre-selected sequence adapted to target specific air pollutants that have been identified as being particularly dangerous to human health.
3. The air purifier (10) of claim 2 wherein said pre-selected sequence is further characterized by including one or more filter media packets (28) taken from the list comprising:
 - a) a desiccant - adsorbent packet (28) containing within a gross particulate medium envelope therein a quantity of filter medium comprising various types of silica gel, zeolite and/or molecular sieves;
 - b) an adsorbent packet (28) containing within a gross particulate medium envelope therein a filter medium adapted to adsorb sulfur oxides, ozone and other gases, said filter medium comprising packed activated carbon;
 - c) a catalyst packet (28) to break down carbon monoxide, within a gross particulate medium envelope;
 - d) an adsorbent packet(28) containing within a gross particulate medium envelope therein a filter medium adapted to adsorb benzene and other hydrocarbons, said filter medium comprising various types of coconut

based activated carbon.

e) a HEPA pleated filter (30); and

f) a carbon based filter (170).

5. The air purifier (10) of claim 3 wherein said carbon based filter (170) designated as filter f) therein is a second instance of the type therein designated as filter d).
6. The air purifier (10) of claim 3 wherein said carbon based filter (170) designated as filter f) thereof is a coconut-based carbon impregnated fiber medium.
7. The air purifier (10) of claim 1 being further characterized in having an air baffle (40) disposed transversely across said air conduit (44) at a longitudinal position next adjacent to said one or more fans (42).
8. The air purifier (10) of claim 7 wherein said air baffle (40) is further characterized in having a multiplicity of baffle blades (132) in the form of plate-like structures disposed generally coplanar with the direction of air flow through said air conduit (44), but further comprising one or more bends in the structure of each of said multiplicity of baffle blades (132), said bends lying along bend lines disposed transversely to said direction of air flow, whereby distal portions of said baffle blades (132) become disposed at pre-selected angles to said direction of air flow.
9. The air purifier (10) of claim 1 wherein said cover (52) is fixedly attached to said main frame (12) near to said air outlet (36) and removably attached to said main frame (12) near to said air inlet (32).
10. The air purifier (10) of claim 9 wherein said cover (52) is formed of an elastic, airtight material that can be drawn free of said main frame (12) at said removable attachment near to said air inlet (32) of said main frame (12), and further being capable of being drawn in a longitudinal direction towards said air outlet (36) of said main frame (12), thereby to provide access to the interior of said air conduit (44).
11. The air purifier (10) of claim 1 wherein said main frame (12) is further characterized in having an elongate, open-topped box-like structure including a bottom plate (14), two end walls (22, 24), and two side walls (20) wherein said two end walls (22, 24) at opposite ends thereof are interconnected by said two side walls (20) in an airtight manner, and all of said end walls (22, 24) and said side walls (20) are connected in an airtight manner around the

periphery of said bottom plate (14).

12. The air purifier (10) of claim 11 wherein said cover (52) when fully installed is disposed so as to lay over top edges of said side walls (20) in an airtight relationship.

13. The air purifier (10) of claim 11 wherein said main frame (12) is further characterized in including two mutually parallel interior walls (26), disposed parallel to said two side walls (20) at a pre-determined distance inwardly from said two side walls (20), said side walls (20) having a pre-determined height, and said two interior walls (26) having a pre-determined height that is greater than said height of said side walls (20).

14. The air purifier (10) of claim 13 wherein said cover (52) when fully installed is disposed so as to lay over top edges of said interior walls (26) in an airtight relationship.

15. The air purifier (10) of claim 7 being further characterized in having at least one compressible and airtight air blocking sheet (68, 70) disposed along an edge surface of each of said multiplicity of air filters (28), of said HEPA filter (30), of said one or more fans (42), and of said air baffle (40), said disposition also lying immediately adjacent an inner surface of said cover (52), whereby inward pressure from said cover (52) will tend to compress the material of said at least one air blocking sheet (68, 70) into any spatial gaps between said inner surface of said cover (52) and said edge surfaces of each of said multiplicity of air filters (28), of said HEPA filter(30), of said one or more fans (42), and of said air baffle (40), thereby to preclude any air passage therethrough.

16. The air purifier (10) of claim 1 wherein said main frame (12) is further characterized in containing at least one battery compartment (66) adaptable to receive and store one or more batteries (72) that are in an electrically connectable relationship with said one or more fans (42, said at least one battery compartment (66) further being disposed separately from said air conduit (44) in an airtight relationship.

17. The air purifier (10) of claim 16 wherein each of said at least one battery compartment (66) is separated in an airtight manner from said air conduit (44) by one of said interior walls (26).

18. The air purifier (10) of claim 16 being further characterized in having an air flow switch (88) disposed electrically between said one or more batteries

(72) and said one or fans (42), and being adapted to make or break electrical connection therebetween at the option of a user.

19. The air purifier (10) of claim 1 wherein said cover (52) is further characterized in having access means (78) adapted to be opened and closed so as to provide access to said at least one battery compartment (66) at the option of a user.

20. The air purifier (10) of claim 1 wherein at least one of said multiplicity of air filters (28) comprises a filter media packet (28).

21. The air purifier (10) of claim 20 wherein said filter media packet (28) is a packed bed filter media packet (28).

22. A method of providing purified air to a person or other air breathing animal by:

- a) providing an airtight air conduit (44) having an air inlet (32) and an air outlet (36), wherein said air conduit includes therein a series of air filters (28) through which air is drawn into said air conduit (44) through said air inlet (32) and thence out of said air conduit (36) through said air outlet (36) by means of one or more fans (42) powered by an electrical power source (72, 76);

- b) providing power means (72, 76, 172) for operating said one or more fan (42); and

- c) placing said air outlet (36) in airtight fluid connection with an air pipe (48) characterized in being adapted to be placed in airtight fluid connection with breathing apparatus that is wearable by a person or other air breathing animal.

23. A method of providing emergency air filtration capability within an air purifier (10), comprising:

- a) taking from the clothing of the user an amount of pollutant absorbing thermal insulation material that will fit into a filter media packet (28);

- b) providing an empty filter media packet (28) and placing said amount of pollutant absorbing thermal insulation (180) into said filter media packet (28); and

- c) placing said filter media packet (28) now containing said amount of pollutant absorbing thermal insulation (180) into said air purifier (10).